

enhancing properties of the pad of this invention. First of all, the pad eliminates or masks certain touch stimuli such as temperature and texture and thereby improves the ability to detect the touch stimuli which enable the determination of shape and hardness. Secondly, the pad reduces friction between the user and the object being touched. This eases the movement of the fingertips across the object and helps prevent any tendency of the fingertips to skip across a portion of the object.

Thirdly, the pad helps immobilize the object being touched. A very small object, protrusion, or indentation is detected most readily by passing the fingertips across it. If the object moves with the fingertips, it is more difficult to detect. For example, it is very difficult to feel a single human hair upon a hard, smooth surface. At least part of the difficulty is because the hair tends to stick to the fingers. When the pad is used, the hair is immobilized and the fingertips can be moved back and forth across the hair, enabling it to be detected.

Fourthly, the pad adheres to and follows the contours of objects so well that it, in effect, increases the size of the object for detection purposes. In the above example of the human hair, the increase in the hair's diameter by several thousandths of an inch (which results when one wall of the enclosure adheres to the hair) creates a much larger protrusion for the fingertips to feel. Fifthly, the pad may actually increase the surface area of the fingertips in contact with an object.

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We claim:

1. An apparatus which enhances the sense of touch when placed between the fingertips of the user and the object being touched, the apparatus comprising:

(a) a sealed enclosure of a single piece of a pliable, elastic material having a wall thickness of about 0.005 to 0.020 inches, a modulus at 300 percent elongation of less than about 1,500 psi, a tensile strength of greater than about 3,000 psi, and an ultimate elongation of greater than about 400 percent so that the enclosure is resistant to tearing or puncturing and is able to conform to the contours of the object being touched and to readily transmit touch stimuli; and

(b) a liquid lubricant inside the enclosure which has sufficient lubricity to reduce the coefficient of kinetic friction between the interior walls of the enclosure by at least about 60 percent so that the bottom wall of the pad remains stationary over the object being touched while the top wall moves

freely with the fingertips, a sufficiently-high resistance to mass transfer through the enclosure so that the amount of lubricant inside the enclosure remains substantially constant over time, substantial inertness towards the enclosure, and which is present in an amount sufficient to fully coat the interior of the enclosure, provided that the amount of the liquid lubricant permits the enclosure to be flattened with at least about 75 percent of the surface area of one wall in contact with the other wall with only a *minimum* layer of lubricant between the walls.

2. The apparatus of claim 1 wherein the enclosure comprises rubber prepared from natural or synthetic rubber latex.

3. The apparatus of claim 2 additionally comprising a gas inside the enclosure which has substantial inertness towards the enclosure and which is present in a volume at least about double the volume of the liquid lubricant, provided that the combined volumes of the liquid lubricant and the gas permit the enclosure to be flattened with at least about 75 percent of the surface area of one side in contact with the other side.

4. The apparatus of claim 3 wherein the enclosure is formed of a single piece of rubber which has a single opening physically sealed to prevent the flow of liquid or gas therethrough.

5. The apparatus of claim 4 wherein the gas comprises air.

6. The apparatus of claim 5 wherein the enclosure comprises rubber prepared from natural rubber latex.

7. The apparatus of claim 6 wherein the enclosure material has a modulus of 300 percent or less than about 700 psi, a tensile strength of greater than about 4,000 psi, and an ultimate elongation of greater than about 600 percent.

8. The apparatus of claim 7 wherein the lubricant comprises glycerine, polyethylene glycol, or propylene glycol.

9. The apparatus of claim 8 wherein the enclosure has a wall thickness of about 0.010 to 0.015 inches.

10. The apparatus of claim 9 wherein the lubricant comprises propylene glycol.

11. A method of enhancing the sense of touch which comprises placing the apparatus of claim 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 between the fingertips of the user and the object being touched.

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12. An apparatus which enhances the sense of touch when placed between the fingertips of the user and the object being touched, the apparatus comprising:

(a) a sealed enclosure of a plurality of pieces of a pliable, elastic material having a wall thickness of about 0.005 to 0.020 inches, a modulus at 300 percent elongation of less than about 1,500 psi, a tensile strength of greater than about 3,000 psi, and an ultimate elongation of greater than about 400 percent so that the enclosure is resistant to tearing or puncturing and is able to conform to the contours of the object being touched and to readily transmit touch stimuli; and

(b) a liquid lubricant inside the enclosure which has sufficient lubricity to reduce the coefficient of kinetic friction between the interior walls of the enclosure by at least about 60 percent so that the bottom wall of the pad remains stationary over the object being touched while the top wall moves freely with the fingertips, a sufficiently-high resistance to mass transfer through the enclosure so that the amount of lubricant inside the enclosure remains substantially constant over time, substantial inertness towards the enclosure, and which is present in an amount sufficient to fully coat the interior of the enclosure, provided that the amount of the liquid lubricant permits the enclosure to be flattened with at least about 75 percent of the surface area of one wall in contact with the other wall with only a minimum layer of lubricant between the walls.

13. The apparatus of Claim 11, wherein the sealed enclosure is formed of two pieces of a pliable, elastic material.

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